

5.1 Project Management Plan

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Abstract

The present deliverable conforms to the Project Management Plan (PMP) for F4EClim Project. It is aimed at providing guidelines for the timely and efficient management of the project. The document provides the context in which the project is framed, including reference material and the maintenance of the document. It also elaborates on the objectives of the project and the work plan to achieve them, including Work Packages (WPs), Tasks, and their corresponding leaders. A section is devoted to the management structure, including the composition of the different boards, and the different roles and rules that apply. A quality management plan is presented, including all the processes involved and the ensurement of F4EClim to Horizon Europe rules SESAR 3 JU project handbook. The risks and the associated risk management plan are also presented. We devote the final two sections to analyse how the potential solution of F4EClim should follow the SESAR 3 JU performance management and how to integrate it into the ATM master plan.

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¹ Representatives of the beneficiaries involved in the project

F4EClim

FLYING ATM FOR ENVIRONMENT CLIMATE

F4EClim

This document is part of a project that has received funding from the SESAR 3 Joint Undertaking under grant agreement No 101167020 under European Union's Horizon Europe research and innovation programme.



We provide now a high-level summary of the project F4EClim: Flying alternative trajectories for the benefit of Climate

F4ECLIM's primary aim is to advance aCCFs by integrating weather forecasts and climate science to address uncertainties tied to CO₂, contrails, ozone, methane, and water vapor climate effects. This involves evolving aCCFs to version 2.0, broadening their geographical scope (currently limited to the North Atlantic), considering diverse weather and seasonal patterns, and incorporating various climate metrics. These advancements will feed into a climate service for the aviation community. Additionally, F4ECLIM will explore aviation's potential to reduce its climate impact through the development of robust flight planning algorithms. These algorithms will identify eco-efficient aircraft trajectories, assessing the associated climate impact reduction and costs. Backtesting procedures will be employed to scrutinize trajectories and climate models, providing insights into model specifications. The project will culminate in recommendations and the introduction of key performance indicators (KPIs) to guide stakeholders in implementing eco-efficient trajectories, reducing uncertainties, and advancing understanding of the non-CO₂ impact of aviation for a greener future.

Specifically, the objectives of F4EClim are:

- O-1 Extend aCCFs of CO₂ and non-CO₂ climate effects to represent different seasons, different geographic regions and confidence intervals.
- O-2 Explore the potential for mitigating aviation's climate impact considering its uncertainties by creating advanced flight planning algorithms to identify robust, climate-optimized trajectories.
- O-3 Provide aviation stakeholders with recommendations and supportive measures to implement eco-efficient aircraft trajectories.

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List of Acronyms

Name	Acronym
Algorithmic Climate Change Functions	a-CCFs
Artificial Intelligence	AI
General Assembly	GAss
Grant Agreement	GA
Key Performance Areas	KPA
Key performance indicators	KPI
Maturity Assessment Tool	MAT
Project Coordinator	PC
Project Management Plan	PMP
Risk, issue and opportunity	RIO
Sustainable Development Goals	SDGs
Technology Readiness Level	TRL
Work packages	WP

1 Introduction

Annex 1 of the Grant Agreement (GA - 101167020) (SESAR 3 Joint Undertaking , 2024) provides the contractual baseline of the project by means of the Description of the Action. It contains a high level description of what the project is aiming to achieve and how and which additional outputs will be produced in terms of deliverables. The descriptions of these deliverables in the Grant Agreement provide a common reference for the project and the SESAR 3JU to support the assessment of the project achievements.

While the GA provides a common reference about the project it does not cover all the details necessary for managing the project on a daily basis. This project management plan (PMP) therefore complements what is already defined in the GA by detailing how the project will be executed. It does this by explaining how the programme management and content integration guidance published by the SESAR 3JU is put into practice for this specific project, without repeating that guidance material. It does not contradict the Grant Agreement in any way, nor the project handbook.

While this document aims to avoid duplication of material from the references it builds on, some elements may nevertheless be repeated to make the PMP document as readable as possible without continuously having to consult all the reference material.

1.1 Applicable reference material

Unless otherwise stated in this PMP, the execution of the project **will be fully compliant** with the latest version of the Digital European Sky (DES) project handbook (SESAR 3 Joint Undertaking, 2022) available in the programme library.

1.2 PMP maintenance

This project management plan has been produced at the beginning of the project as a contractual deliverable. Its main purpose is however to be part of the daily management tools of the project team and at the same time to support the coordination between partners y providing insight in how the project is organised and managed.

The PMP is intended to be a living document, providing increasingly detailed information through periodic updates as the F4EClim project progresses and significant changes arise.

We envision two phases for the PMP:

1. Initial PMP (Current version of the document), which includes the main guidelines.
2. Intermediate Version PMP, month 13 (before the Intermediate Review Meeting).

2 Overview of the project

2.1 Project objectives

The primary purpose of F4ECLIM is to advance aCCFs by integrating weather forecasts and climate science to address uncertainties tied to non-CO₂ effects, e.g., contrail-cirrus, NO_x-induced effects on ozone, methane, and water vapor. This involves evolving aCCFs to version 2.0, broadening their geographical scope (currently limited to the North Atlantic), considering diverse weather and seasonal patterns, and incorporating various climate metrics. These advancements will feed into a Met service on climate effects for the aviation community. Additionally, F4ECLIM will explore aviation's potential to reduce its climate impact through the development of robust flight planning algorithms. These algorithms will identify eco-efficient aircraft trajectories, assessing the associated climate impact reduction and costs. Hindcast procedures will be employed to scrutinize trajectories and climate models, giving insights in provision of non-CO₂ effects. The project will culminate in recommendations and the introduction of key performance indicators (KPIs) to guide stakeholders in implementing eco-efficient trajectories, reducing uncertainties, and advancing the understanding of the non-CO₂ impact of aviation for a greener future.

The specific objectives are:

O-1 Extend aCCFs of CO₂ and non-CO₂ climate effects to represent different seasons, different geographic regions and confidence intervals.

O-2 Explore the potential for mitigating aviation's climate impact considering its uncertainties by creating advanced flight planning algorithms to identify robust, climate-optimized trajectories.

O-3 Provide aviation stakeholders with recommendations and supportive measures to implement eco-efficient aircraft trajectories.

Scope	Objective	SESAR solution	Work package	Deliverable
	O-1 Extend aCCFs of CO ₂ and non-CO ₂ climate effects to represent different seasons, different geographic regions and confidence intervals.		WP1	D1.1 Exploratory Research Report (ERR)(Initial)
	O-2 Explore the potential for mitigating aviation's climate impact considering its uncertainties by creating advanced flight planning algorithms to identify robust, climate-optimized trajectories.		WP2	D2.1 Concept outline (Initial)
	O-3 Provide aviation stakeholders with recommendations and supportive measures to implement eco-efficient aircraft trajectories.		WP3	D3.1 Solution Slides (Initial version)
D3.2 Met service on climate effects (Software Package)				
D3.3 Solution Slides (Intermediate version)				
D3.4 Solution Slides (Final)				

Table 1. List of deliverables

Comentado [FY1]: This column has no contents. Can we remove it or it is a part of the template?

Comentado [GP1R2]: Yes, it is part of the template. Could be the scope TRL 0 in O1 and O2; and TRL1 in O3?

Comentado [MS1R3]: No idea what to include as Scope.

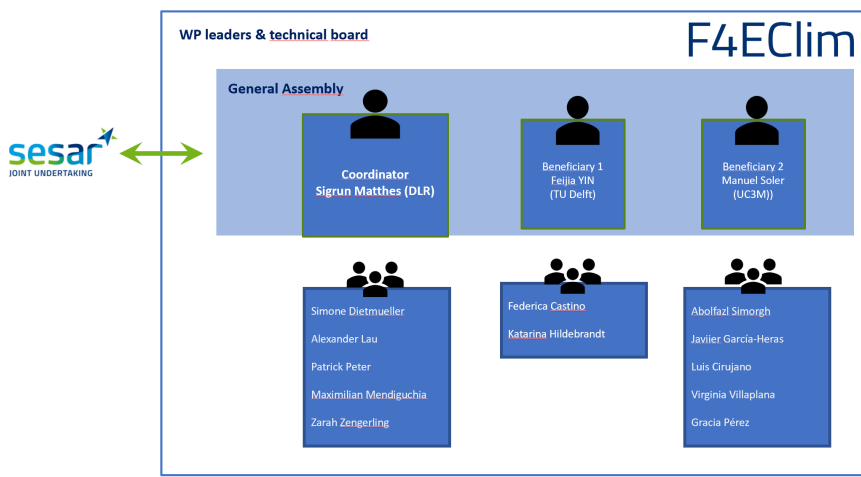
2.2 Project milestones

Scope	Objective	SESAR solution	Work package ²	Milestone
	O-1 Extend aCCFs of CO ₂ and non-CO ₂ climate effects to represent different seasons, different geographic regions and confidence intervals.		WP1	MS-6 New prototype aCCFs available for testing
				MS-9 Framework to represent climate Met service on climate effects uncertainties ready
				MS-10 Trade-offs between different non-CO ₂ effects assessed
	O-2 Explore the potential for mitigating aviation's climate impact considering its uncertainties by creating advanced flight planning algorithms to identify robust, climate-optimized trajectories.		WP2	MS-5 ROOST, ROC and PyTOM ready
				MS-11 Large Scale Simulations of Robust Climate Optimal Trajectories ready
	O-3 Provide aviation stakeholders with recommendations and supportive measures to implement eco-efficient aircraft trajectories.		WP3	MS-7 Method for evaluation defined (internal)
				MS-12 Intermediate evaluation for exemplary routes completed (internal)
				MS-13 Final evaluation for entire route network performed
				MS-14 Demonstration of F4ECLIM dashboard tool
	The main objective of this WP is to perform project administration and project coordination, while monitoring workplan, implementation and ensuring project research planning.		WP5	MS-1 Consortium Agreement
				MS-2 First Sprint Planning
				MS-3 Minutes of KOM
	Develop appropriate plans for the project management, dissemination, communication and exploitation activities.		WP4-WP5	MS-4 PMP, CDE Plan F4ECLIM
			ALL	MS-8 Technical Project Review with maturity assessment
				MS-15 Latest date for technical deliverables for maturity gate
				MS-16 Exit maturity gate

Table 2. List of milestones

3 Project management and organisation

3.1 Management structure



Comentado [GP2]: If anyone is missing, please let mi know

Comentado [MS2R2]: I believe it is OK.

Figure 1: Management Structure Chart

3.2 Organisation and roles

The tables below elaborate on section 3.2 of Annex 1 Part B of the Grant Agreement (101167020) and provide the names of the people allocated to the various teams / roles in the project.

In F4EClim project a lean and efficient management structure will be applied. This structure allows for fast decision making. The combined legislative-executive level is composed of the Project Coordinator (PC) and the General Assembly (GAss).

3.2.1 Project management team

Role ³	Description	Name	Beneficiary
Project manager	The PM, as a central point of reference, participates in activities of all boards, coordinating the administrative day-to-day management tasks, resolves conflicts and	Sigrun Matthes	DLR

³ Definitions of typical roles are provided in the Project Handbook

	monitors the work progress with respect to the project plan. The PM shall be the intermediary between the Parties and SESAR JU, as Funding Authority.		
Project coordinator ⁴	The PC performs the day-to-day management of the project on the executive and technical level, and shall perform all tasks assigned to it as described in the Grant Agreement (Annex 1, part B).	Sigrun Matthes	DLR
Risk manager	Responsible for identifying and reporting RIOs; defining appropriate mitigation actions; monitoring and tracking the status of their implementation; communicating about RIO status and actions undertaken	Manuel Soler	U3CM
Validation Lead	Responsible of fostering exchange between parties on validation objectives, definition of requirements, and achievements.	Zarah Zengerling	DLR
Concept Lead	Responsible for concept development comprising meteorological requirements for MET service provision	Simone Dietmüller	DLR
CDE lead	Plan, document and coordinate CDE activities	Feijia Yin	TU Delft
Quality lead	Responsible for ensuring that all processes, deliverables, and outcomes meet high-quality standards and comply with both project and EU guidelines.	Sigrun Matthes	DLR

Table 3: Project management team roles

3.2.2 Project management board

Role	Description	Name	Beneficiary
PC	As PC, advises and supervises the project management board	Sigrun Matthes	DLR-PA
Substitute PC	WP1 Leader	Simone Dietmüller	DLR-PA
Member	WP2 Leader	Manuel Soler	UC3M
Member	WP3 Leader	Alexander Lau	DLR-LV
Member	As CDE lead, coordination CDE activities, WP4 leader	Feijia Yin	TU Delft

Table 4: Project management board roles

⁴ As defined in the Grant Agreement.

3.2.3 Stakeholders

In the F4EClim project, project objective O-3 specifically targets aviation stakeholders, by providing recommendations and supportive measures to implement eco-efficient trajectories. An overview on project organisation for the consortium partners (comprising workpackage leads, and specific thematic aspects) is provided, followed by a brief overview on individual stakeholder groups targeted.

Stakeholder	Description	Interest(s)	Engagement ⁵
DLR	Project partners	Lead of WP1, WP3 and WP5, research center; interest in air traffic management, meteorology and climate change.	Responsible
TU Delft	Project partners	Lead of WP4, academic institution; interest in climate change.	Responsible
UC3M	Project partners	Lead of WP2, academic institution; interest in air traffic management	Responsible
Business entites (flight Dispatchers)	Flight Dispatchers	Integration of aCCFs into flight dispatching solutions and technologies <i>for strategic and tactical trajectory planning and optimization.</i>	Consulted
Business entites (Air Navigation Services Providers)	Air Navigation Services Providers	Integration of aCCFs into airspace and flow management decision-making.	Consulted
Business entities (Meteorological services)	Meteorological services	Integration of climate information into numerical weather products.	Consulted
European Commission/SESAR 3 JU	Funding entites	Incorporate new solutions. Pass maturity gates and scale in the TRL pipeline to include future topics in ATM applied research and/or Industrial Research tracks.	Accountable
Scientific community	Scientific community	Climate change related to non-CO ₂ effects; air traffic management	Informed roles
Governments, policy makers and regulators (e.g., EASA, EUROCONTROL)	Policy makers	Policy recommendations in mitigating aviation's climate impact	Accountable
General public	General public	Rise awareness about climate change	Informed roles

Table 5: Stakeholder matrix

3.3 Internal project communication

3.3.1 Internal Communication

In the F4EClim project, internal communication is essential for correct functioning and more efficient work, that is why we have set up a specific tool for this purpose, Microsoft Teams (MS-Teams). Which

⁵ RACI matrix: Responsible, accountable, consulted, informed roles.

is used for the daily communication and as a file repository. Where important documents, templates and necessary information, among other things will be stored.

3.3.2 Meeting management

The meetings and their objectives are the following:

- The Kick-off meeting took place at M1 and it is an SJU official meeting. It aims at informing the project partners about the operational and applicable financial provisions in more detail, and reviewing the project objectives, organisation, deliverables, resources, planning, communication and dissemination activities and other relevant information as outlined in Annex I of the GA.
- Progress meetings. Planned on the first Wednesday of each month. The purpose of these meetings is to supervise:
 1. General issues (minutes, workspace, meeting software, Stellar, access)
 2. Action Items (see slides from last meeting, organization, follow-up).
 3. Progress in individual workpackages (Short overview on status provided by WP leads)
 4. Dissemination & Exploitation (SID-recap, WebSite, upcoming conferences, articles)
 5. Other issues
- The Project Intermediate Review meeting is planned between months 14 and 15 and it is an SJU official meeting. It is supported by the Periodic Technical and Financial Report (M14). It consists of a presentation summarizing the progress and technical results achieved during the first 12 months. It is aimed at assessing the progress and steering the project if necessary to achieve the expected quality and maturity at the Project Gate (Final Review). A review of top-level Risks and Issues will be done to ensure appropriate actions. A Review Report will be issued by the SJU through the EC Portal and the SESAR 3 JU's collaboration platform (STELLAR).
- The Exit Maturity Gate is planned at M22 and it is an SJU official meeting. It will be organized following the submission of: All technical deliverables including the Final Project Results Report; Maturity Gate presentation and Maturity Self-Assessment. It is Supported by continuous reporting on EC Portal and SESAR 3 JU's collaboration platform. It is aimed at:
 - Assessing the achieved Maturity
 - Discussing the project scientific results as documented in the Final Project Results Report and on the achievement of project objectives
 - Discussing the Recommendations for the next R&D Phase
 - A Maturity Gate Report will be issued by the SJU

The PC will provide to the participants, before each meeting, an agenda including the points to be addressed. For all the meetings, the PC will prepare a presentation describing the overall status of the project and will deliver it at the meeting.

3.3.3 Minutes of the meetings

The PC is responsible of taking minutes of every meeting. The minutes of the meetings will be managed according to the following process:

- The PC will send a draft version of the minutes for revision to the members who participated in the meeting for their review and comments.
- The minutes shall be considered as accepted if, within 15 calendar days from receipt, no Party has sent any objection to the PC with respect to the accuracy of the draft minutes.
- The PC will upload the accepted minutes to the consortium file repository (“general” directory in MS-Teams) shared by the consortium.

In case the SJU participates in the meeting, the PC will send the internally-revised version of the minutes to the SJU for further revision before accepting the minutes.

4 Quality management plan

4.1 Management processes for ensuring adherence to Horizon Europe rules and SESAR 3 JU project handbook

In F4EClim we will work together as a consortium to archive all the objectives that are set out in the GA (SESAR 3 Joint Undertaking, 2024), following the Horizon Europe rules and the recommendations and step described in SESAR 3 JU Project Handbook (SESAR 3 Joint Undertaking, 2022) and all the recommended guidelines, in order to ensure the consistency of project data.

The ultimate responsible for ensuring the adherence to the HE rules and SESAR 3 JU project handbook is the coordinator of the project (DLR). The work package leaders are co-responsible for their work packages.

The process to ensure adherence is described in point 4.2 and its subsections.

4.2 Quality process

The F4EClim consortium brings together a catalogue of reputed scientists in different fields contributing to the needed interdisciplinarity, covering the whole spectrum from basic research in Climate Change and Meteorology to Air Traffic Management experts.

F4EClim has a strong commitment to excellent science and will pursue it through:

- Review work package documentation deliverables.
- Do internal peer-review of conference and journal papers before submission.
- Assess the technical and scientific achievements of the work package outputs.
- Comment upon WP progress with respect to the proposed schedule when appropriate.
- Provide general feedback, and when necessary, recommendations that will assist the project coordinator in fulfilling their roles.

4.2.1 Quality for validation activities

F4EClim is an exploratory research / fundamental science solution project, aiming at formulating and preliminarily testing a concept, achieving TRL 1. Since it is not aiming at the advanced development of a solution, the validation activities are limited. Notwithstanding this, the project coordinator will supervise the validation activities and report on them in the following deliverables:

Del. N°	Del. Name	Date	Definition
D5.2	Exploratory research plan (ERP)	M6	The exploratory research plan describes the way in which one or more validation exercises or activities are to be prepared and executed in order to achieve

			the validation objectives of an Exploratory Research project.
D1.1	Exploratory research report (ERR)	M13	The exploratory research report consolidates the results obtained by an exploratory research project once the validation activities, experiments, etc, have been completed.
D5.5	Exploratory research report (final)	M20	

Table 6. Digital European Sky programme deliverables

4.2.2 Deliverable quality process

Each WP is led by a WP Leader, who manages and monitors the progress of the tasks and the deliverables of their WPs through a continuous dialogue with the GAss. Each WP Leader is responsible for:

- Coordinating the work of his WP.
- The scientific/technical progress of the activities in the WP.
- The planning, monitoring and reporting (periodical reports & deliverables) of each task in his/her WP.
- Using the Official Templates published in the STELLAR portal.

Before the submission of a project deliverable, it will be reviewed and approved according to the following process:

- At least 20 days before the due date of the deliverable, the WP Leader responsible of producing the deliverable will send a draft version to the members of the project for revision.
- Within 7 days after receiving the draft, the reviewers will provide, if any, their comments.
- At least 5 days before the due date, the WP Leader will send a revised version of the draft addressing the comments given in the revision to the members of the project
- The process will be iterated until the approval of the PC. Before the due date, the PM will submit the approved deliverable to the SJU portal and EC Portal.

WP	Deliverable	Lead	Estimated date
WP1	D1.1 Exploratory Research Report (ERR)(Initial)	DLR	M13
WP2	D2.1 Concept outline (Initial)	DLR	M13
WP3	D3.1 Solution Slides (Initial version)	DLR	M13
	D3.2 Met service on climate effects (Software Package)	UC3M	M20
	D3.3 Solution Slides (Intermediate version)	DLR	M20
	D3.4 Solution Slides (Final)	DLR	M20
WP4	D4.1 DEC Plan (with periodic updates)	TU Delft	M3
	D4.2 Data Management Plan (initial)	TU Delft	M6
	D4.3 DEC Plan (Intermediate version)	TU Delft	M13
	D4.4 DEC Plan (final)	TU Delft	M28

	D4.5 Data Management Plan (final)	TU Delft	M28
WP5	D5.1 Project management Plan (PMP)	UC3M	M03
	D5.2 Exploratory research Plan (ERP)	DLR	M06
	D5.3 Project Management Plan (Intermediate version)	DLR	M13
	D5.4 Concept outline (Final)	DLR	M20
	D5.5 Exploratory Research Report (ERR)(Final)	DLR	M20
	D5.6 Final Project Report	DLR	M20

Table 7. List of work packages and deliverables leaders

4.2.3 Maturity assessment

The maturity assessment consists of checking whether or not the set of SESAR maturity criteria for a given TRL maturity phase is successfully achieved for the SESAR solution under analysis. It is supported by a maturity assessment tool (MAT) provided by the SESAR 3 JU.

Thus, after defining the solution and its target TRL level, we will provide a maturity self-assessment. See the criteria to be satisfied for a solution targeting TRL1 (see Table 8). We will thus provide a rationale to all the criteria.

ID	Criteria	Satisfaction	Rationale - Link to deliverables - Comments
TRL 1.1	Has the ATM problem/challenge/need(s) that innovation would contribute to solve been identified? - Where does the problem lie? - Has the ATM problem/challenge/need(s) been quantified that justify the research done? Note: an initial estimation is sufficient	Achieved Not Achieved Partially Achieved	
TRL 1.2	Have the solutions (concepts/capabilities/methodologies) under research been defined and described?	Achieved Not Achieved Partially Achieved	
TRL 1.3	Have assumptions applicable for the innovative concept/technology been documented?	Achieved Not Achieved Partially Achieved	
TRL 1.4	Have the research hypothesis been formulated and documented?	Achieved Not Achieved	

		Partially Achieved	
TRL 1.5	<p>Do the obtained results from the fundamental research activities suggest innovative solutions (e.g. concepts/methodologies/capabilities)?</p> <p>- What are these new concepts/methodologies/capabilities?</p> <p>- Can they be technically implemented?</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	
TRL 1.6	<p>Have the potential strengths and benefits of the solution identified and assessed?</p> <p>- Qualitative assessment on potential benefits. This will help orientate future validation activities. Optional: It may be that quantitative information already exists; in which case it should be used.</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	
TRL 1.7	<p>Have the potential limitations, weaknesses and constraints of the solution under research been identified and assessed?</p> <p>- The solution under research may be bound by certain constraints, such as time, geographical location, environment, cost of solutions or others.</p> <p>- Qualitative assessment on potential limitations. This will help orientate future validation activities. Optional: It may be that quantitative information already exists; in which case it may be used.</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	
TRL 1.8	<p>Do fundamental research results show contribution to the Programme strategic objectives, e.g., performance ambitions identified at the ATM MP Level?</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	
TRL 1.9	<p>Have stakeholders been identified, consulted and involved in the assessment of the results? Has their feedback been documented in project deliverables? Have stakeholders shown their interest on the proposed solution?</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	
TRL 1.10	<p>Have initial scientific observations been communicated and disseminated (e.g., technical reports/journals/conference papers)?</p>	<p>Achieved</p> <p>Not Achieved</p> <p>Partially Achieved</p>	

TRL 1.11	Are recommendations for further scientific research documented?	Achieved	
		Not Achieved	
		Partially Achieved	

Table 8. ER Fund / AO Research Maturity Assessment – Pre-TRL1 to TRL1

4.2.4 Maturity gate

The purpose of this phase is to assess and agree on the actual maturity (TRL) of a SESAR solution; and subsequently, to agree on recommendations and perform an RIO assessment for the next phase of maturity development. In F4EClim, the target TRL for the single solution of the project is TRL1. The management of the Maturity Gate is described in detail below.



Figure 2. Maturity Gate Overview

The **planning of an exit maturity gate session (0)** has already been performed. F4EClim project has been established in the Annex 1. Description of Action (part b) Grant Agreement to execute the exit maturity gate session on M22.

The **submission of the Technical deliverables in STELLAR (A)**, relevant for the maturity gate process of the solution, is scheduled for M20. At this point, the PC will:

1. Propose and agree with the SESAR 3 JU on an available time slot for the exit maturity gate session
2. Perform the maturity self-assessment in STELLAR
3. Begin the preparation of the exit maturity gate session presentation

The **preparation and execution of the exit maturity gate session (B)** includes the reception of any feedback from the SESAR 3 JU regarding the maturity of the SESAR solution, including inputs from the review panel: transversal projects / SESAR 3 JU experts / external experts supporting the SESAR 3 JU. This is planned to occur 15 days prior to the meeting.

At the exit maturity gate, the PC will

1. Provide a presentation on the SESAR solution: scope, validation results and benefits, ...

2. Provide feedback on the maturity concerns raised by the review panel
3. Present the project maturity self-assessment for the SESAR solution
4. Present the project plans for the next maturity phase (if applicable)

With this information, the review panel is expected to:

1. Conclude on the maturity achieved by the SESAR solution
2. Identify risks, issues and opportunities
3. Allocate required actions, e.g., to update SESAR solution technical deliverables

As a result of this process, a **decision on the Maturity Gate (C)** will take place. Possible outcomes, as defined in DES ER 1 Projects KoM Slides (SESAR 3 Joint Undertaking , 2023) are listed in table 9.

Exit Maturity gate decision	Exit Maturity gate status
COMPLETED	<ul style="list-style-type: none"> • TRLx successfully achieved • No risks or issues identified
COMPLETED – WITH ACCEPTABLE RISKS	<ul style="list-style-type: none"> • TRLx successfully achieved: technical deliverables and results are sufficient to pass this gate • Non-blocking concerns can be addressed in next TRL phase • Risks and issues (and mitigation actions) recorded in STELLAR
ACHIEVED-P	<ul style="list-style-type: none"> • TRLx successfully achieved • No formal maturity gate: TRLx justified by solution maturity self-assessment
CONDITIONAL	<ul style="list-style-type: none"> • The maturity gate cannot conclude e.g. missing evidence, which can be addressed in a relatively short timeframe as part of the project activities • Requires a follow-up maturity gate
CLOSED	<ul style="list-style-type: none"> • The solution did not provide expected benefits, proved unfeasible, etc. and it is proposed to be closed since it does not justify additional R&I work • Opportunities for future R&I activities may be recorded in STELLAR • This may trigger need for Grant Amendment
NOT COMPLETED	<ul style="list-style-type: none"> • TRLx not achieved • Blocking concerns mean that further R&I activities are required before completing TRLx • This may trigger need for Grant Amendment

Table 9. Maturity Gate Decision

Finally, SESAR will **publish the solution technical deliverables (D)** on the SESAR 3 JU website.

4.2.5 Change management

In case that one of the partners is interested in making a change, he will send a duly justified request to the PC, and then the PC will pass the request to the GAss. Within 15 days after receiving the request, the GAss will approve or reject the request. If the request is accepted by the GAss, a request for change will be sent to the SJU via the Programme Manager.

4.2.6 Project review

The PC will coordinate the preparation of the project reports to the SJU and has the final responsibility for editing according to a standard layout and for the distribution. The periodic reports will be

submitted via the HE Funding & Tenders Opportunities portal and SESAR 3 JU's collaboration platform within 60 working days following the end of the two Reporting Periods established in the GA, namely:

- RP1: from month 1 to month 12
- RP2: from month 13 to month 30

The Final Project Report will be delivered within 60 days from the completion of the project.

4.2.6.1 Periodic Reports

For the elaboration of the Periodic Reports, each WP Leader is responsible for producing, by the end of the reporting period, of cost statements and management control reports that contain the current status of the active work packages he/she is performing as a reference, these periodic reports include:

1. The Periodic Technical Report containing:
 - An explanation of the work carried out by the beneficiaries.
 - An overview of the progress towards the objectives of the action, including milestones and deliverables, and the monitoring of risks. If any, this report must include explanations justifying the differences between work expected to be carried out in accordance with GA and that actually carried out.
 - The report must detail the exploitation and dissemination of the results.
 - The report must indicate the communication activities.
 - A summary for publication by the JU.
2. The Periodic Financial Report containing:
 - An 'individual financial statement' (Annex 4 in the GA) from each beneficiary, for the reporting period concerned. The individual financial statement must detail the eligible costs for each budget category (Annex 2 in the GA).
 - An explanation of the use of resources and the information on subcontracting (if any) and in-kind contributions provided by third parties (in any) from each beneficiary, for the reporting period concerned.
 - A 'periodic summary financial statement', created automatically by the electronic exchange system, consolidating the individual financial statements for the reporting period concerned and including — except for the last reporting period — the request for interim payment.

4.2.6.2 Final Technical and Financial Reports

The Final Report covers the whole project and is composed of a Technical and Financial part. It is delivered within 60 days from the completion of the project.

Among others, the Technical Report provides:

- An overview of the results and their exploitation and dissemination;
- The conclusions.

- The socio-economic impact.
- The validation report.

The Final Financial Report, includes:

- A 'final summary financial statement', created automatically by the electronic exchange system, consolidating the individual financial statements for all reporting periods and including the request for payment of the balance.
- A 'certificate on the financial statements', drawn up in accordance with Annex 5 in GA for each beneficiary.

The Final Project Report (deliverable D5.6) covers all the research activities performed by the project, based on a template to be provided by the SJU. This report will be used at the Final Review Meeting and Maturity Gate to discuss the transition to subsequent development stages including a self-assessment of the TRL achieved at the end of the project. The SJU will verify the maturity achieved in order to establish the appropriate transition of the results to subsequent phases. This report will be delivered to the SJU for approval in Month 20.

5 Risk management plan

5.1 Risk, issue and opportunity (RIO) management process

The PC together with the GAss are responsible for identifying, monitoring, reporting and managing the risks, issues and opportunities that may affect the progress or results of the project throughout its life. They will be managed as follows:

1. Identifying and classifying RIOs. Several potential risks have already been identified at proposal time; the PC and GAss will remain alert to identify new ones.
2. Defining appropriate mitigation/avoidance actions.
3. Monitoring and tracking the status of the mitigation/avoidance action implementation.
4. Updating, at least, every 6 months at the GAss meetings, the list of risks in the SESAR 3 JU'S collaboration platform and EC Portal.
5. Escalating RIOs to SJU and EC as necessary.
6. Communicate about RIOs status and actions undertaken as necessary.

The PC will keep record of all identified RIOs in a RIO Register. The initial version of the RIO Register, consisting of the risks identified in the F4EClim proposal, is presented in the next Table 10.

Risk number	Description	WP	Mitigation
1	Inadequate coordination	WP5	Severity: High. Likelihood: Low (The project Coordinator has experience in coordinating several EU research projects and 2 SESAR projects: ATM4E and FlyATM4E). Mitigation: Regular exchange within the consortium. Discussion with SESAR 3 JU leading possibly to changes in the grant agreement.
2	Conflicts between partners	WP5	Severity: Medium. Likelihood: Low (All partners have experience in working in EU projects. Moreover, they have had successful collaborative experiences in the past. Mitigation: Any unsolved conflict will be addressed at Steering Board level voting if disagreement persists.
3	Withdrawal of partner	All	Severity: High. Likelihood: Low (All partners have shown strong commitment and interest during the preparation of the proposal). Mitigation: Regular exchange within the consortium and collaborative work. Discussion with SESAR 3 JU leading to an amendment to the Grant Agreement.
4	Major delays in milestones	All	Severity: High. Likelihood: Low (All partners have vast experience in their disciplines, respectively.

			They have been solving similar problems in the past and all agree the time allocated is enough to carry out the tasks). Mitigation: Discussion between the coordinator and the WP leaders to find alternatives.
5	IPR issues	All	Severity: High. Likelihood: Low (a clear and detailed definition of the IPR strategy among all involved actors will be stated in the Consortium Agreement. IPR monitoring will be a recurrent agenda item in all SB meetings.). Mitigation: Discussion with the partners
6	Delay in delivering the new set of high complexity aCCFs.	WP1	Severity: High. Likelihood: Low. Mitigation: DLR and TU Delft have worked on the previous aCCFs development and gained good experience, hence continuity in collaboration. We will rely on models that have been running in the past and can be easily adapted to deliver the simulations required in F4ECLIM. Furthermore, the combination of low complexity and high complexity concepts mitigates the risk of the WP1 delay.
7	Run Time of the Large-Scale Simulations	WP2	Severity: High. Likelihood: Medium (We have experience in large-scale simulations. Indeed, we have run the complete 2022 -365 days. In any case, it is time consuming and any delay in WP1 activities may affect the timeliness of the large-scale simulation). Mitigation: Reduce the scope of the large scale simulations.
8	Restricted data availability for publication in Met service on climate effects.	WP3	Severity: High. Likelihood: Low. Data availability might be restricted to publication depending on licensing agreements. Consortium experience in previous projects can be relied on. Mitigation: Early data approval for application and availability of alternative data providers.

Table 10. List of RIO

6 Performance management

We will follow the SESAR 3 JU performance management process as described in the figure below:

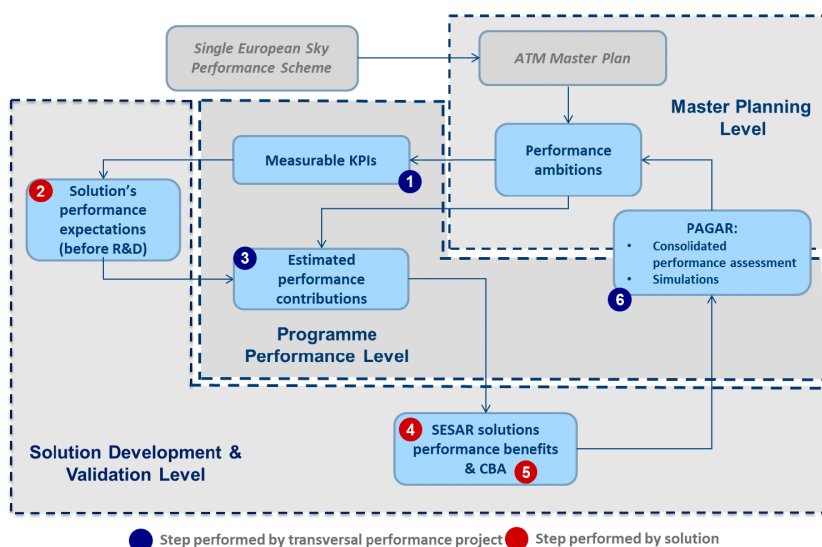


Figure 3. Experimental Research Plan (From the SJU3 Project Handbook)

F4EClim will thus follow the following scheme:

1. We will identify those Key Performance Areas (KPA) in which F4EClim solution is expected to bring benefits.
2. We will also identify existing Key Performance Indicator (KPI) to measure the performance impact. This will be defined in the experimental Research plan.
3. The estimated contributions will be also defined in the experimental Research plan. This will come together with the Research Questions to be answered and the Hypotheses to be verified.
4. The experimental exercises will be executed. The obtained contributions measured using the KPIs will be then reported in the Exploratory Research Report.
5. The results of the experimental exercise, including the quantification of expected gains (measured with KPIs in the KPA) will be integrated in the Solution description.
6. The solution will be then integrated in the ATM Master Plan (SESAR Joint Undertaking 3, 2020) (see Section 7).

7 Content integration management

We herein sketch the approach we will follow to ensure that the F4ECLim solution is integrated into the ATM Master plan (SESAR Joint Undertaking 3, 2020).

7.1 Contribution to the ATM Master Plan

First of all, we will describe the solution, then proceed to analyse the existing solutions in the ATM Master Plan and then we will describe the solution within the ATM Master Plan, going down to the level of enablers, stakeholder identification, initial operational capability date, etc. as described in Section 3.5 of the Project handbook (SESAR 3 Joint Undertaking, 2022).

7.1.1 Proposed Solution for F4ECLim project

Code	Name	Project contribution	Maturity at project start	Maturity at project end
TBD	TBD	F4ECLIM Solution will be a web service containing information about climate impact of aviation in European airspace. In particular, it will include: 1) a forecast of those regions in which climate impact is expected to be large (this will be obtained by combining aCCF-V2.0 and the available Numerical Weather Product) 2) visualization of trajectories and their associated climate impact using different metrics.	Pre TRL1	

Table 11. Project Maturity – F4ECLim Solution

7.1.2 Existing SESAR solutions

This 2020 edition of the European ATM Master Plan (SESAR Joint Undertaking 3, 2020) introduces nine new Essential Operational Changes top-down as nine essential “game changers”. They are triggering structural evolutions of the European ATM, that are required to deliver the SESAR vision, up to the “digital European sky” enabling the delivery of the Single European Sky’s objective to implement “more sustainable and better performing aviation”.

Outputs from the SESAR Programme R&I activities which relate to an Operational Improvement (OI) step or a small group of OI steps and its/their associated enablers, which have been designed, developed and validated in response to validation targets that, when implemented, will deliver business benefits to the European ATM.

Reviewing the existing solutions, there are NO solutions directly targeting topics related to climate change. When it comes to Operational Improvements and Technical Enablers, we neither find topics directly targeting climate change.

Thus, there is a clear need to develop this strand into future editions of the ATM Master Plan (SESAR Joint Undertaking 3, 2020).

7.1.3 F4EClim solution within the ATM Master Plan

As F4EClim is a solution project with TRL <4, the central aspect to address in the content integration plan is the alignment of the project results with the information taxonomy set-up of SESAR.

To this end, integration will be accomplished in coordination with the SESAR transversal projects. The process shall be articulated along two axes:

- Assess the consistency and coherence of information in support of the SESAR architecture
- Validate that the information is aligned with the vision of the ATM Master Plan (SESAR Joint Undertaking 3, 2020)

The process shall provide inputs to the maturity gate, to confirm that the content is aligned with the master plan and the inputs of other solutions.

8 References

SESAR 3 Joint Undertaking . (2023). *Digital European Sky Exploratory Research 1 Projects, Kick-off Meeting*. Brussels.

SESAR 3 Joint Undertaking . (2024). *F4EClim Grant Agreement Number 101167020*.

SESAR 3 Joint Undertaking. (2022). *Digital European Sky Project Handbook: Programme Execution Framework*.

SESAR 3 Joint Undertaking. (2022). *SESAR Multiannual Work Programme (2022-2031)*.

SESAR Joint Undertaking 3. (2020). *European ATM Master Plan* .

Appendix A Project initiation file

Please complete the initiation file in coordination with the SESAR 3 JU and submit the final version as a separate attachment to the PMP document.

Please see the file [file name] attached to this PMP.